

CLAIMS

We Claim:

1. A silicon thin film transistor comprising:
 - a substrate;
 - 5 - a barrier layer of porous silica (SiO_2) deposited directly on said substrate; and
 - a thin film of silicon that has been caused to be polycrystalline, deposited directly on said barrier layer.
- 10 2. The silicon thin film transistor according to claim 1, wherein the barrier layer has a porosity ratio in the range from about 20% to about 90%.
3. The silicon thin film transistor according to claim 2, wherein the barrier layer has a thickness in the range from 30% to 60%.
- 15 4. The silicon thin film transistor according to claim 1, wherein the barrier layer has a thickness in the range from about 150 nm to about 1000 nm.
5. The silicon thin film transistor according to claim 4, wherein the barrier layer has a thickness in the range from about 400 nm to about 600 nm.
- 20 6. The silicon thin film transistor according to claim 1, wherein the thin film has a thickness in the range from about 20 nm to about 80 nm.
7. The silicon thin film transistor according to claim 6, wherein the thin film has a thickness in the range from about 50 nm to about 80 nm.
- 25 8. The silicon thin film transistor according to claim 1, wherein the size of the grains of polycrystalline silicon in the thin film is greater than or equal to 1 μm .
- 30 9. The silicon thin film transistor according to claim 1, wherein the substrate is made of glass.

10. A method of manufacturing a silicon thin film transistor, the method comprising the following steps:

a) depositing a porous silica barrier layer directly on a substrate;

b) depositing an amorphous silicon thin film directly on the barrier layer; and

5 c) irradiating the amorphous silicon thin film using a laser to obtain a thin film of polycrystalline silicon.

11. The method according to claim 10, wherein said method further comprises, between step b) and step c), a step of dehydrogenating the amorphous silicon thin film.

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12. The method according to claim 10, wherein in step a), the barrier layer of porous silica is deposited by a sol-gel method.

13. The method according to claim 10, wherein in step b), the amorphous silicon thin film is deposited by plasma-assisted chemical vapor deposition.

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14. The method according to claim 10, wherein in step c) irradiation is performed using an excimer laser.

15. The method according to claim 14, wherein in step c) irradiation is operating at 248 nm or at 308 nm.

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16. The method according to claim 15, wherein step c) is performed with an excimer laser operating at 308 nm.

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17. The method according to claim 10, wherein the thickness of the barrier layer lies in the range from about 150 nm to about 1000 nm.

18. The method according to claim 17, wherein the thickness of the barrier layer is in the range from about 400 nm to about 600 nm.

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19. The method according to claim 10, wherein the porosity ratio of the barrier layer lies in the range from about 20% to about 90%.

5 20. The method according to claim 19, wherein the porosity ratio of the barrier layer is in the range from about 30% to about 60%.

21. The method according to claims 10, wherein the thickness of both the amorphous and polycrystalline silicon thin film lies in the range from about 20 nm to about 80 nm.

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22. The method according to claim 21, wherein the thickness of both the amorphous and polycrystalline silicon thin film is in the range from 50 nm to 80 nm.

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23. The method according to claim 10, wherein the substrate is made of glass.

24. A display screen, characterized in that it includes at least one polycrystalline silicon thin film transistor according to either claim 1 or 10.

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25. A method of manufacturing a display screen, characterized in that it includes the method of manufacturing a polycrystalline silicon thin film transistor according to claim 10.